Protective and cleansing effect of a skin care product against pollen allergen accumulation in the hair follicle

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BACKGROUND

Environmental airborne elements such as pollutant matters, chemicals, or allergens, such as pollen allergens accumulate on the skin and more particularly in the *infundibula* of the hair follicle due to its specific form and function. This accumulation can lead to irritation, discomfort or even sensitization and allergic reactions. Thereby, prevention of accumulation or cleansing of these elements within *infundibulum* is a key challenge to protect skins submitted to environmental factors. A new study model was set up to mimic pollen allergen deposit onto the skin and test the efficacy of a skin care product to prevent or cleanse the allergen accumulation.

MATERIAL & METHODS

- Explants processing

Skin explants from an abdoplasty of a 33-years-old Caucasian male were obtained and set up on Perfex *vivo*® system (BioEC). Recombinant pollen allergen Phl p 5b (Abcam ref. ab225974, Timothy grass pollen) was applied topically for 6 hours.

- Dermo-cosmetic product treatment

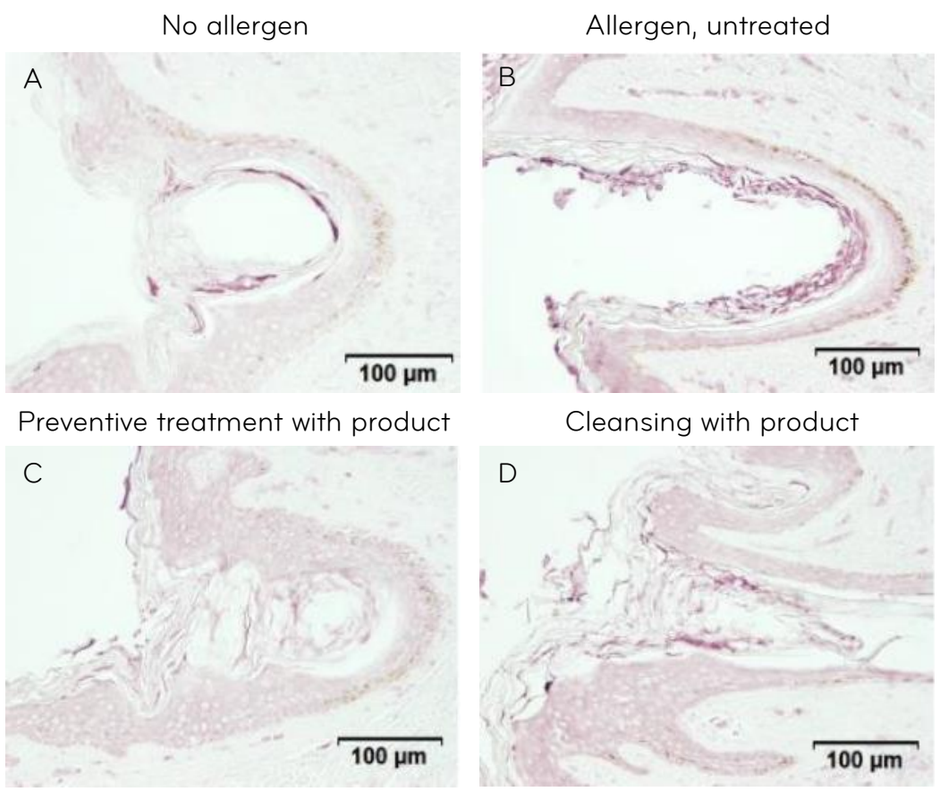
In order to test the preventive efficacy or cleansing performance of a dermo-cosmetic product containing biomimetic lipids and mineral oil, two protocols were used:

- 10min prior to pollen allergen exposure, the dermo-cosmetic product was applied topically (2µL/cm²) and spread on the surface of the explant.
- Skin surface was rubbed successively with two cotton disc soaked with the product after 6 hours of pollen allergen exposure.

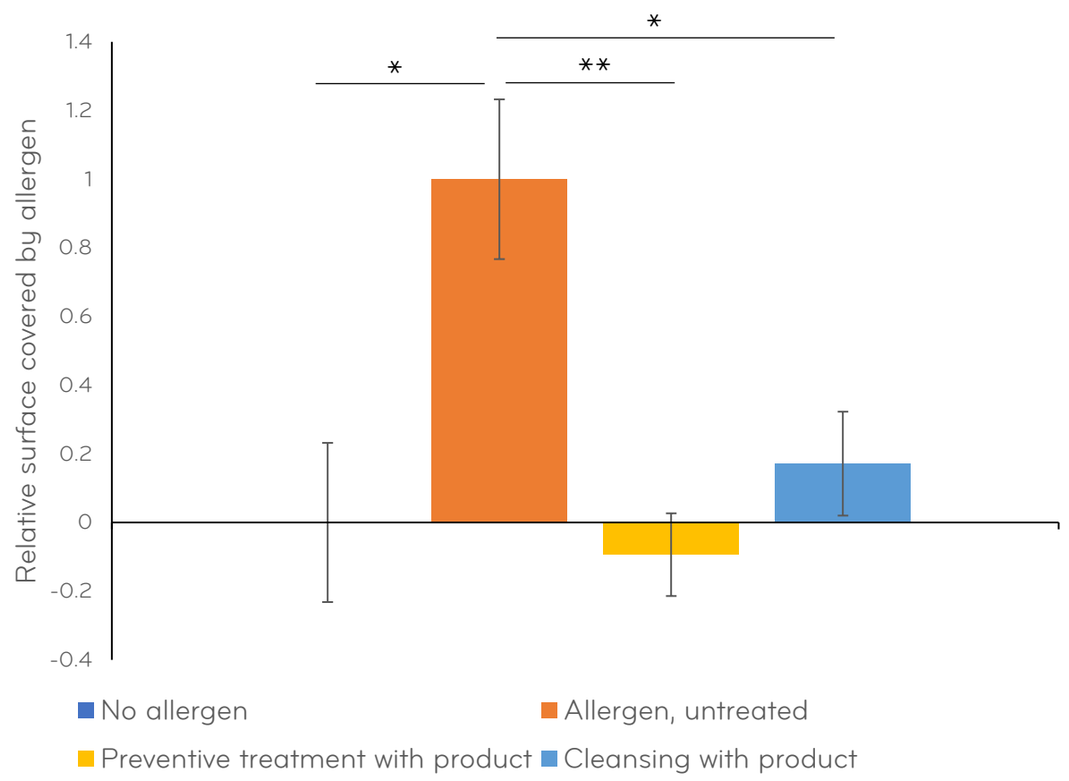
- Immunostaining, imaging and analysis

After pollen allergen exposure and product treatment, explants were fixed and proceed for paraffin embedding. 5µm sections were obtained and stained with an anti-Phl p 5b antibody (Biorbyt, ref. orb51666) and peroxidase technic.
The stainings were observed by microscopy and pictures of *infundibulum* areas were obtained. The surface percentage of the region of interest (*infundibulum*) covered by the staining was determined by image analysis.
Unpaired t-test were performed to compare experimental groups, *: p<0,05 and **: p<0,01.

RESULTS



Allergen staining showed a faint unspecific signal in the *infundibulum* of untreated samples (A). After allergen presentation, a **high increase of the staining** intensity could be observed demonstrating pollen allergen accumulation (B). Preventive treatment prior to allergen presentation (C) or cleansing after (D) led to a high **decrease of the staining**.



After allergen exposure, the quantification of the surface covered by the staining revealed a significant increase of pollen allergen accumulation in the *infundibulum* (+149%).
Preventive treatment with the dermo-cosmetic product **totally preserved from the accumulation** of the allergen in the *infundibulum*.
Cleansing with the same dermo-cosmetic product allowed a **strong elimination of the accumulation** (-83%).

CONCLUSION

The developed *ex vivo* model allowed to mimic pollen allergen exposure and its accumulation on the skin and particularly along the *infundibulum*. The protective effect, thanks to its film forming capacity and the cleansing effect of a dermo-cosmetic product could be demonstrated. The double effect supported by the product makes it an ally to protect skin from environmental airborne elements allowing sensitization processes prevention.